

REMARKS

Claims 1-4 and 6-11 are pending.

In Paragraph No. III at pages 2-3 of the final Action, claims 1-4 and 6-11 are rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Uenishi et al (6,489,080). See also Paragraph Nos. I and II at pages 2-3 of the Advisory Action, where this rejection is repeated.

Applicants submit that this rejection should be withdrawn because Uenishi et al '080 does not disclose or render obvious the positive-working resist composition of the present invention.

As recited in independent claim 1, the present invention relates to a positive-working resist composition. The resist composition includes:

(A1): A resin containing a repeating unit represented by formula (1) shown in claim 1 and a repeating unit represented by formula (2) in claim 1. The resin has a property of being insoluble or sparingly soluble in an alkali developing solution and becoming soluble in an alkali developing solution by the action of an acid.

(B): A compound capable of generating a sulfonic acid upon irradiation with active rays or radiation, in an amount of from 5 to 20% by weight based on the total solids content of the resist composition.

And (D): A compound capable of generating a carboxylic acid upon irradiation with active rays or radiation.

In the Response Under 37 CFR 1.116 filed April 13, 2006, Applicants explained in detail why Uenishi et al '080 does not disclose or render obvious the positive-working resist composition of the present invention. Specifically, Uenishi et al '080 does not anticipate or

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render obvious the present invention for at least the reason that Uenishi et al '080 does not disclose or suggest the use, in combination, of (B) a compound capable of generating a sulfonic acid upon irradiation with active rays or radiation, in an amount of from 5 to 20% by weight based on the total solids content of the resist composition, and (D) a compound capable of generating a carboxylic acid upon irradiation with active rays or radiation.

In Paragraph No. I at page 2 of the Advisory Action, the Examiner states "Applicants urge that the applied Uenishi et al (6,489,080) is not related to 'positive-working resist composition.'" The Examiner has misunderstood Applicants' position. Applicants did not argue that Uenishi et al is not related to a positive-working resist composition. What Applicants argued was that Uenishi et al '080 does not disclose or render obvious the positive-working resist composition of the present invention. See page 2 of the Response Under 37 C.F.R. § 1.116 filed April 13, 2006.

Next, the Examiner states:

Applicants urge that PGA4 (15, 21 and 31) is capable to generate a sulfonic acid only. In the absence of a test to prove it, PGA4 (15, 21 and 31) is withdrawn from the rejection until someone later show or provide an evidence to the contrary. Then the allowed claim or a patent would have no value.

In Paragraph No. II of the Advisory Action, the Examiner repeats from the final Action the § 102(b) anticipation rejection of claims 1-4 and 6-11 based on Uenishi et al '080.

The Examiner's characterization of Uenishi et al and his reasoning in support of the rejection are the same as set forth in Paragraph No. III of the final Office Action, except that the Examiner now relies solely on compound PAG 3-16 of Uenishi et al '080 as an alleged carboxylic acid generator. He has dropped his citation to Uenishi et al '080's PAG4 (15, 21 and 31).

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Why the Examiner has dropped his reliance on three of the compounds but continues to rely on Uenishi et al PAG 3-16 is unclear. In the Response filed April 13, 2006, Applicants pointed out that none of these compounds generate a carboxylic acid. See the next-to-last paragraph on page 3 of the Response filed April 13.

In any event, Applicants again point out that Compound PAG 3-16 of Uenishi et al '080 is a compound which generates hexafluorophosphoric acid (HPF₆) and Compounds PAG 4-15, PAG 4-21, and PAG 4-31 of Uenishi et al '080 are compounds which generate a sulfonic acid (R-SO₃⁺). They do not generate a carboxylic acid.

To evidence this point, Applicants submit herewith a Declaration Under 37 CFR 1.132 of Mr. Fumiyuki Nishiyama showing how photoacid generators PAG 3-16, PAG 4-15, PAG 4-21 and PAG 4-31 of Uenishi et al produce an acid, and showing what those acids are. As is clearly seen from the decomposition mechanisms shown in the Declaration, none of the photoacid generators PAG 3-16, PAG 4-15, PAG 4-21 and PAG 4-31 of Uenishi et al generates a carboxylic acid.¹

In view of above, reconsideration and withdrawal of the §102(b) rejection based on Uenishi et al '080 are respectfully requested.

In Paragraph No. IV of the final Action, claims 1-4 and 6-11 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Uenishi et al '080 in view of Ishihara et al (2004/0033434).

¹ For the Examiner's convenience, an unexecuted copy of the Declaration is provided in addition to the executed version. The Chemical formulas in the unexecuted version are somewhat easier to read.

Applicants submit that this rejection should be withdrawn because Uenishi et al '080 and Ishihara et al do not disclose or render obvious the positive-working resist composition of the present invention, either alone or in combination.

As discussed in response to the preceding rejection, Uenishi et al '080 does not disclose a compound capable of generating a carboxylic acid as a PAG (photo acid generator) at all. Thus, Uenishi et al '080 necessarily fails to disclose or suggest a positive working resist composition comprising (A1), a resin containing a repeating unit represented by formula (1) shown in present claim 1 and a repeating unit represented by formula (2) shown in present claim 1, (B) a compound capable of generating a sulfonic acid upon irradiation in an amount of from 5 to 20% by weight based on the total solids content of the resist composition, and (D) a compound capable of generating a carboxylic acid upon irradiation. For at least these reasons, Uenishi et al '080 does not disclose or render obvious the positive working resist composition of the present invention.

As explained in the Response file April 13, Ishihara et al does not make up for the deficiencies of Uenishi et al '080. While a compound capable of generating a carboxylic acid is essential in Ishihara et al, Ishihara et al does not teach the combined use of (D) a compound capable of generating a carboxylic acid, with (A1) a resin containing a repeating unit represented by formula (1) and a repeating unit represented by formula (2), and (B) a compound capable of generating a sulfonic acid, in a specific amount, as claimed in the present application.

Even if a prima facie case of obviousness could be established based on Uenishi et al '080 in view of Ishihara et al, which it cannot, Applicants have submitted evidence of unexpectedly superior results which rebuts any prima facie case of obviousness and confirms the

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patentability of the present invention. See the Declaration of Mr. Shoichiro Yasunami, the first-named inventor of the present application, filed with the Amendment Under 37 C.F.R. § 1.111 on November 17, 2005. The evidence in Mr. Yasunami's Declaration is discussed in detail at pages 9-10 of the Amendment filed November 17, 2005.

Further, Applicants have responded in detail to the Examiner's criticisms of the Declaration evidence at pages 5-7 of the Response filed April 13. That response is incorporated here in its entirety and the Examiner is requested to reconsider it.

Even still further, Applicants submit herewith the Declaration Under 37 CFR 1.132 of Mr. Nishiyama which provides even more evidence of the unexpected superiority of the present invention. Specifically, Examples a and b in Mr. Nishiyama's Declaration are responsive to the Examiner's concern that Applicants have not provided enough examples of the resist composition of the present invention to fairly say that the results are representative of the full scope of the invention as claimed. The Examiner will note that Examples a and b employed 5.5 wt% and 19.5 wt% of the sulfonic acid generator, respectively, thus being representative of the full scope of the recited amount (i.e., from 5 to 20% by weight). On consideration of all the evidence of record, the resist composition of the present invention is patentable over Uenishi et al '080 and Ishihara et al.

In view of the above, reconsideration and withdrawal of the § 103(a) rejection based on Uenishi et al '080 in view of Ishihara et al '434 are respectfully requested.

In Paragraph No. V at page 8 of the final Action, claims 1-4 and 6-11 are rejected under 35 U.S.C. § 102(a) as allegedly being anticipated by Ishihara et al '434.

Applicants submit that this rejection should be withdrawn because Ishihara et al '434 does not disclose or render obvious the positive-working photoresist composition of the present invention.

Under the law, anticipation under section 102 requires identity of invention. Ishihara et al does not identically disclose the present invention.

Specifically, and as explained in the Response filed April 13, 2006, Ishihara et al does not identically describe or anticipate the present invention. The Examiner has not pointed to a specific working example in Ishihara et al '434 which anticipates the present claims, and there is no description in Ishihara et al which would cause a person of ordinary skill in the art to immediately envision the resist composition of the present invention. To the contrary, the Examiner has reconstructed the positive-working resist composition of the present invention from Ishihara et al's generic disclosure using hindsight. Ishihara et al in formula [11] at page 7 and formula [12] at page 8 discloses a very broad genus of resins. The Examiner has made numerous selections to reconstruct the present invention. For example, the Examiner has required t to be a natural number, but t may be 0.

Similarly, the Examiner has chosen $R^{(18)}$ to be an alkyl group to satisfy the requirements for resin A2 in present claim 3. However, formula (3) in present claim 3 requires that Z_1 be a hydrocarbon group having from 1 to 5 carbon atoms, whereas $R^{(18)}$ in Ishihara et al '434 is an alkyl group "having generally 1 to 10 carbon atoms." Thus, the Examiner necessarily has selected only those groups having 5 carbon atoms or less.

Further, in formula [12] of Ishihara et al, the Examiner has required that r' be a natural number, when r' in formula [12] of Ishihara et al may be 0.

Still further, there is nothing in Ishihara et al '434 which suggests using, in combination, a resin satisfying the requirements for resin A1 of the present claims and a resin satisfying the requirements for resin A2 of the present claims, as required by present claim 3.

Still further, the Examiner has selected R⁽¹⁹⁾ in formula [11] and [12] of Ishihara et al to be a hydrogen atom, apparently to meet formula (4) in present claim 6. See the first repeating unit illustrated for formula (4) at the bottom of page 22 of the present specification. In regard to claim 6, the Examiner has also required that e be a natural number other than 0, when per Ishihara et al., e may be 0.

Even still further, Ishihara et al does not disclose working examples which use a resin corresponding to the resin described in the present application. In the repeating unit represented by formula (1) contained in the resin of the present invention, Z represents a hydrocarbon group having from 6 to 30 carbon atoms. In contrast, Ishihara et al only discloses a repeating unit with a hydrocarbon group having 2 carbon atoms (ethoxy) in the position corresponding to -O-Z in present formula (1). See the resin employed in Experimental Example 1 at page 16 of Ishihara et al. That is, the structures of the resins are originally different.

A similar analysis could be made for present claim 7, as for claim 6.

For all of these reasons, Ishihara et al '434 simply does not disclose or fairly suggest the positive working resist composition of the present invention. To reconstruct an invention from a highly generic disclosure based on hindsight, as has been done in the present case, is improper and is not the appropriate test of patentability under §103. The present invention is patentable over Ishihara et al '434.

Even if a prima facie case of obviousness could be established based on Ishihara et al, which it cannot, Applicants submit herewith a Declaration Under 37 CFR 1.132 which provides evidence of unexpectedly superior results and supports the patentability of the present invention over Ishihara et al.

As discussed in response to the preceding rejection, Examples a and b reported in Mr. Nishiyama's Declaration provide experimental data demonstrating the superior results obtained with the present invention. Both of Examples a and b employ a sulfonic acid generator in an amount within the scope of claim 1 of the present application. Comparative example a' demonstrates the difference between the present invention and Ishihara et al (US 2004/0033434). Comparative example a' employs Resin I described in Ishihara et al, which corresponds to a resin containing a repeating unit represented by formula (1) of the present application in which R_1 , R_2 and R_3 represent a hydrogen atom; n represents 0; R_4 represents a methyl group; and Z represents C_2H_5 . Resin I of Ishihara et al is outside the scope of formula (1) of present claim 1 because the C_2H_5 group is outside the definition of Z in present claim 1. (Specifically, Resin I of Ishihara et al is the Poly[4-(1-ethoxyethoxy)styrene/4-tert-butoxystyrene/p-hydroxystyrene] resin used in Experimental Example 1 at page 16 of Ishihara et al. The (1-ethoxyethoxy)styrene repeating unit is the repeating unit of interest.)

From the comparative experimental data shown in Mr. Nishiyama's Declaration in addition to the working examples of the present specification and the comparative experimental data in the Rule 132 Declaration filed on November 17, 2005, it is understandable that the present invention provides unexpectedly superior effects. From a comparison of Examples a and b with Comparative Example a' which employs Resin I of Ishihara et al, it is understandable that

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superior effects in terms of sensitivity, resolution, pattern shape and line edge roughness etc. can be achieved by using a specific resin and a sulfonic acid generator within a specific amount range, and further a carboxylic acid generator together. These superior results obtained with the positive working resist composition of the present invention would have been unexpected to a person of ordinary skill in the photoresist art. Comparative Example a' employing Resin I of Ishihara et al cannot achieve the effects of the present invention.

In view of the above, the Examiner is respectfully requested to reconsider and withdraw the §102 anticipation rejection of present claims 1-4 and 6-11 based on Ishihara '434.

Allowance is respectfully requested. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

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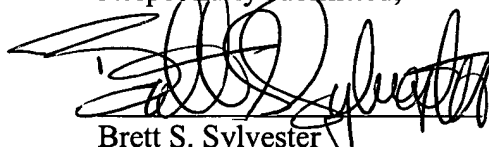
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